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Cardiology B

Unusual Cauliflower Imaging Revealing Pacemaker Endocarditis

N. El Karroumi[1*], A. Benssied[1], K. Alami[1], S. Hattach[1], I. Fellat[1]

[1]Cardiology B Department, Ibn sina hospital, Rabat, Morocco

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***Corresponding author:** N. El Karroumi
Cardiology B Department, Ibn sina hospital, Rabat, Morocco

Abstract | **Case Report**

Cardiac implantable electronic device (CIED)- related infective endocarditis is one of the most severe complications following device implantation, and its incidence is increasing with the widespread use of the pacemakers and other cardiac devices. Diagnosis and management remain challenging, particularly regarding the optimal strategy for lead extraction. We report the case of a 72-year-old man with a pacemaker implanted in 2021 who presented fever for more than two months despite antibiotic therapy. The pacemaker pocket was clean and cardiac auscultation was normal. Transthoracic and transesophageal echocardiography revealed a large vegetation attached to the pacemaker leads without tricuspid valve involvement. Intravenous antibiotic therapy with vancomycin and gentamicin was initiated, later switched to teicoplanin due to persistent fever. Given persistent infection and large vegetation, surgical extraction was performed via sternotomy under cardiopulmonary bypass. The leads were removed with the vegetation and an epicardial pacemaker was implanted because the patient was pacing-dependent.

Keywords: Right-sided endocarditis, pacemaker infection, Staphylococcus infection, vegetation.

INTRODUCTION

Infective endocarditis is one of the most serious and potentially life-threatening complications following cardiac implantable electronic device (CIED) implantation. Its incidence has been progressively increasing in parallel with the expanding use of these devices worldwide. Despite advances in imaging and antimicrobial therapy, the diagnosis and management of CIED-related endocarditis remain challenging. A major difficulty lies in determining the optimal strategy for device extraction, which may be performed either through a percutaneous interventional approach or by surgical removal, particularly in complex cases with large vegetations or long-standing leads.

This case highlights the diagnosis and therapeutic challenges associated with CIED-related endocarditis and discusses the considerations influencing the choice of extraction strategy.

CASE REPORT

A 72-year-old man, carrier of a cardiac implantable electronic device since January 2021, presented fever for over 2 months. He received antibiotic treatment with no improvement. Then new symptoms appeared such as arthralgia and night sweats. For that he was admitted in our department for investigations.

In the admission, he had 38,5° of temperature, a pulse of 76 bpm and a blood pressure of 120/75 mmHg. The clinical exam showed intact pulse generator site and heart auscultation was normal. A complete blood count revealed hyperleukocytosis of 18 180 /m³, elevated C-reactive protein to 168 mg/dL and negative blood culture. The urine analysis was normal.

A transthoracic echocardiogram was performed, followed by transesophageal echocardiogram. They both showed a big vegetation measuring over 14x24 mm attached to CIED leads. (Fig 1-2) The tricuspid valve is however unharmed.

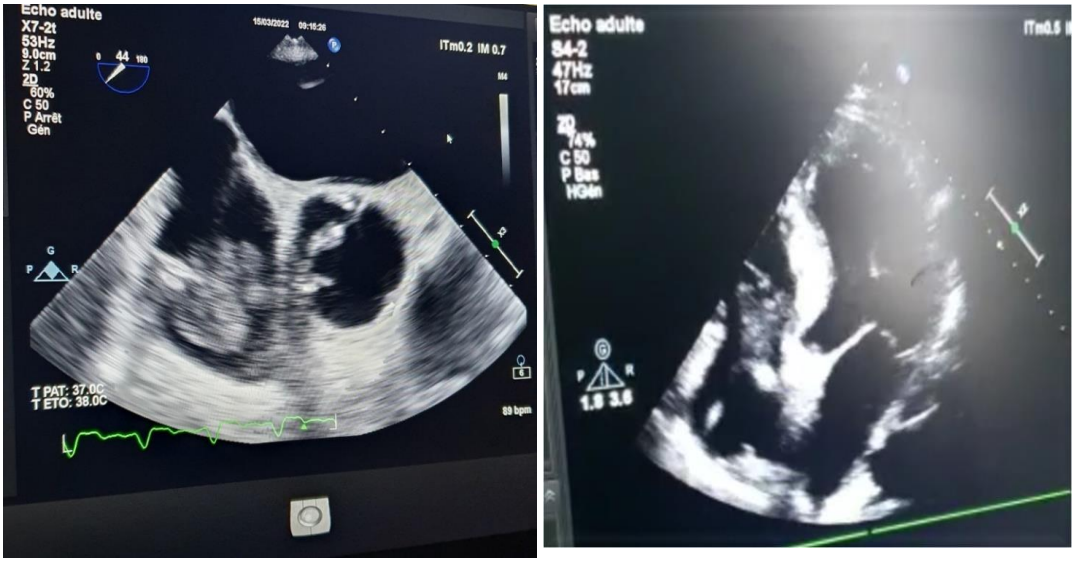

Figure 1 - 2: TTE and TEE images showing attached vegetation to CIED leads, measuring 14 x 24 mm

A vancomycin treatment was introduced plus gentamycin. However, the patient still had daily fever during his entire hospital stay. The heart team decided to change the anti-biotherapy to Targocid. Chest CT angiography was normal with no image of septic emboli. A TTE was repeated and showed no regression of the vegetation size. Biologically, infection indicators ascended after 4 weeks of treatment, and a new analysis of blood culture returned positive to staphylococci. At this step surgery was indicated to remove the pacemaker leads.

A sternotomy with extracorporeal circulation was performed and the electrodes were hardly extracted with a large vegetation. Then implantation of an epicardial pacemaker was performed as long as our patient was dependent of stimulation. Tricuspid valve on the other hand was not affected.

The culture of both electrodes and vegetation were however sterile.

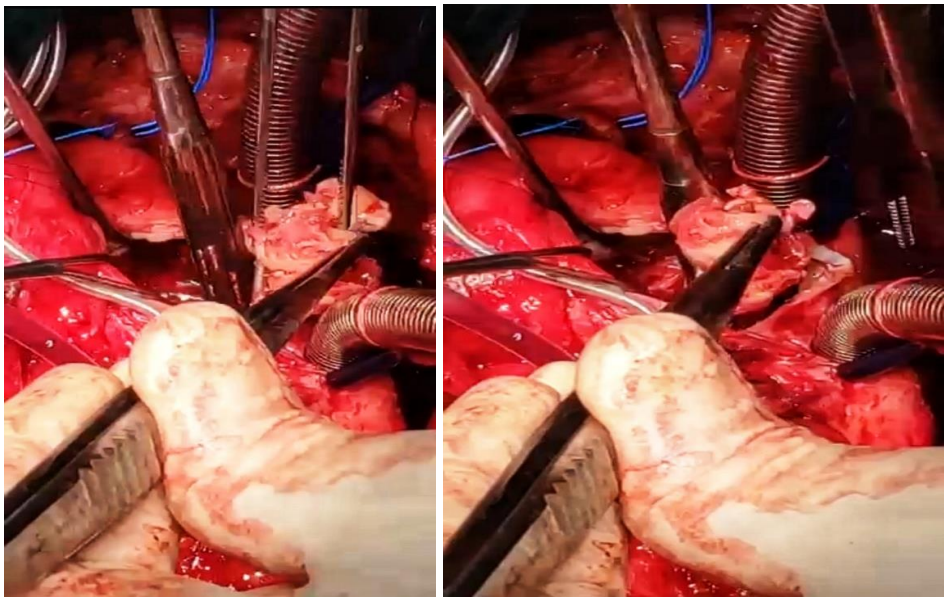

Fig3: OR images showing the removal of the diseased lead

DISCUSSION

Right sided endocarditis represents only 5 to 10 % of all endocarditis cases. The most predisposing situations are congenital heart disease and intravenous drug use however endocarditis related to pacemaker does exist. (De Silva *et al.,* 2009) 3 situations are possible: the infection can be located on PM leads only, on PM leads plus at least one cardiac valve, or on cardiac valves only. (Duval *et al.,* 2004)

Even if the local infection of the pocket generator scar is common, our patient had a clean cicatrix

with no inflammatory signs. He had vegetations located on the PM leads only.

The electrode removal isn't a simple procedure, it is often associated with many complications such as a tear of the tricuspid valve. (De Silva *et al.,* 2009) For that matter, knowing the timing of the implantation is important. After 12 months, the leads are attached to the right endocardium though fibrotic plaques, which may favor surgical removal instead of interventional removal. (Vaccarino *et al.,* 2009)Our patient had his implantation on January 2021 (>12 months) indicating the surgery removal.

Positive blood culture were found in 80 to 100% of endocarditis related to pacemaker, with 78 % due to staphylococci. (Vaccarino *et al.,* 2009) In our case, blood culture was positive to staphylococci in only one analysis. However, the culture of the pacemaker leads and the vegetation was negative.

Many authors judge that the surgical removal with sternotomy is the safest approach when the leads have vegetations. When cardiopulmonary bypass can be avoided, the leads can be removed through a purse string in the right atrium. Nevertheless , this approach is very difficult if the vegetations are very large. (Miralles *et al.,* 2001)

Two options are proposed for pacing after removal, abdominal or transvenous permanent pacemaker. In our case, we preferred to remove all the pacing system surgically and implant an epicardial pacemaker, with four weeks of intravenous antibiotic therapy. And consider an implantation in the contralateral site after few months. Same management done in the four cases presented by Armoni et al. (Arnoni *et al.,* 2000)

However, Massoure *et al.,* in their sixty consecutives cases, preferred to implant a new pacemaker in the contralateral site, on average five days after extraction. (Massoure *et al.,* 2007)

CONCLUSION

Right-sided infective endocarditis differs from left-sided disease in several aspects, including the populations at risk, the predominant pathogens, the response to medical therapy and the pattern of complications.

In most cases, it is associated with a more favorable prognosis and lower mortality compared with left-sided involvement.

Nevertheless, prompt diagnosis and appropriate management remain essential, as outcomes can worsen when infection extends to the left-sided valves or when complications occur.

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